```
import pandas as pd
import numpy as np
df=pd.read_csv('/content/Iris.csv')
df
```

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...	...
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 6 columns

```
df.head()
```

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa

```
df.tail()
```

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

```
df.isna().sum()
```

```
Id              0
SepalLengthCm   0
SepalWidthCm    0
PetalLengthCm   0
PetalWidthCm    0
Species         0
dtype: int64
```

```
df.dtypes
```

```
Id                int64
SepalLengthCm   float64
SepalWidthCm    float64
PetalLengthCm   float64
PetalWidthCm    float64
Species          object
dtype: object
```

```
df.ndim
```

```
2
```

```
df1=df.drop(['Id'],axis=1)
df1
```

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	Iris-virginica
146	6.3	2.5	5.0	1.9	Iris-virginica
147	6.5	3.0	5.2	2.0	Iris-virginica
148	6.2	3.4	5.4	2.3	Iris-virginica
149	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 5 columns

```
x=df1.iloc[:,:-1].values
x
```

```
array([[5.1, 3.5, 1.4, 0.2],
       [4.9, 3. , 1.4, 0.2],
       [4.7, 3.2, 1.3, 0.2],
       [4.6, 3.1, 1.5, 0.2],
       [5. , 3.6, 1.4, 0.2],
       [5.4, 3.9, 1.7, 0.4],
       [4.6, 3.4, 1.4, 0.3],
       [5. , 3.4, 1.5, 0.2],
       [4.4, 2.9, 1.4, 0.2],
       [4.9, 3.1, 1.5, 0.1],
       [5.4, 3.7, 1.5, 0.2],
       [4.8, 3.4, 1.6, 0.2],
       [4.8, 3. , 1.4, 0.1],
       [4.3, 3. , 1.1, 0.1],
       [5.8, 4. , 1.2, 0.2],
       [5.7, 4.4, 1.5, 0.4],
       [5.4, 3.9, 1.3, 0.4],
       [5.1, 3.5, 1.4, 0.3],
       [5.7, 3.8, 1.7, 0.3],
       [5.1, 3.8, 1.5, 0.3],
       [5.4, 3.4, 1.7, 0.2],
       [5.1, 3.7, 1.5, 0.4],
       [4.6, 3.6, 1. , 0.2],
       [5.1, 3.3, 1.7, 0.5],
       [4.8, 3.4, 1.9, 0.2],
       [5. , 3. , 1.6, 0.2],
       [5. , 3.4, 1.6, 0.4],
       [5.2, 3.5, 1.5, 0.2],
       [5.2, 3.4, 1.4, 0.2],
       [4.7, 3.2, 1.6, 0.2],
       [4.8, 3.1, 1.6, 0.2],
       [5.4, 3.4, 1.5, 0.4],
       [5.2, 4.1, 1.5, 0.1],
       [5.5, 4.2, 1.4, 0.2],
       [4.9, 3.1, 1.5, 0.1],
       [5. , 3.2, 1.2, 0.2],
       [5.5, 3.5, 1.3, 0.2],
       [4.9, 3.1, 1.5, 0.1],
       [4.4, 3. , 1.3, 0.2],
       [5.1, 3.4, 1.5, 0.2],
       [5. , 3.5, 1.3, 0.3],
       [4.5, 2.3, 1.3, 0.3],
       [4.4, 3.2, 1.3, 0.2],
       [5. , 3.5, 1.6, 0.6],
       [5.1, 3.8, 1.9, 0.4],
       [4.8, 3. , 1.4, 0.3],
       [5.1, 3.8, 1.6, 0.2],
       [4.6, 3.2, 1.4, 0.2],
       [5.3, 3.7, 1.5, 0.2],
       [5. , 3.3, 1.4, 0.2],
       [7. , 3.2, 4.7, 1.4],
       [6.4, 3.2, 4.5, 1.5],
       [6.9, 3.1, 4.9, 1.5],
       [5.5, 2.3, 4. , 1.3],
       [6.5, 2.8, 4.6, 1.5],
       [5.7, 2.8, 4.5, 1.3],
       [6.3, 3.3, 4.7, 1.6],
       [4.9, 2.4, 3.3, 1. ],
       [6.6, 2.9, 4.6, 1.3],
       [5.2, 2.7, 3.9, 1.4],
       [5. , 2. , 3.5, 1. ],
       [5.9, 3. , 4.2, 1.5],
       [6. , 2.2, 4. , 1. ],
       [6.1, 2.9, 4.7, 1.4],
       [5.6, 2.9, 3.6, 1.3],
       [6.7, 3.1, 4.4, 1.4],
       [5.6, 3. , 4.5, 1.5],
       [5.8, 2.7, 4.1, 1. ],
       [6.2, 2.2, 4.5, 1.5],
       [5.6, 2.5, 3.9, 1.1],
       [5.9, 3.2, 4.8, 1.8],
       [6.1, 2.8, 4. , 1.3],
       [6.3, 2.5, 4.9, 1.5],
       [6.1, 2.8, 4.7, 1.2],
       [6.4, 2.9, 4.3, 1.3],
       [6.6, 3. , 4.4, 1.4],
       [6.8, 2.8, 4.8, 1.4],
       [6.7, 3. , 5. , 1.7],
       [6. , 2.9, 4.5, 1.5],
       [5.7, 2.6, 3.5, 1. ],
       [5.5, 2.4, 3.8, 1.1],
       [5.5, 2.4, 3.7, 1. ],
       [5.8, 2.7, 3.9, 1.2],
       [6. , 2.7, 5.1, 1.6],
       [5.4, 3. , 4.5, 1.5],
       [6. , 3.4, 4.5, 1.6],
       [6.7, 3.1, 4.7, 1.5],
       [6.3, 2.3, 4.4, 1.3],
       [5.6, 3. , 4.1, 1.3],
       [5.5, 2.5, 4. , 1.3],
       [5.5, 2.6, 4.4, 1.2],
       [6.1, 3. , 4.6, 1.4],
       [5.8, 2.6, 4. , 1.2],
       [5. , 2.3, 3.3, 1. ],
       [5.6, 2.7, 4.2, 1.3],
       [5.7, 3. , 4.2, 1.2],
       [5.7, 2.9, 4.2, 1.3],
       [6.2, 2.9, 4.3, 1.3],
       [5.1, 2.5, 3. , 1.1],
       [5.7, 2.8, 4.1, 1.3],
       [6.3, 3.3, 6. , 2.5],
       [5.8, 2.7, 5.1, 1.9],
       [7.1, 3. , 5.9, 2.1],
       [6.3, 2.9, 5.6, 1.8],
       [6.5, 3. , 5.8, 2.2],
       [7.6, 3. , 6.6, 2.1],
       [4.9, 2.5, 4.5, 1.7],
       [7.3, 2.9, 6.3, 1.8],
       [6.7, 2.5, 5.8, 1.8],
       [7.2, 3.6, 6.1, 2.5],
       [6.5, 3.2, 5.1, 2. ],
       [6.4, 2.7, 5.3, 1.9],
       [6.8, 3. , 5.5, 2.1],
       [5.7, 2.5, 5. , 2. ],
       [5.8, 2.8, 5.1, 2.4],
       [6.4, 3.2, 5.3, 2.3],
       [6.5, 3. , 5.5, 1.8],
       [7.7, 3.8, 6.7, 2.2],
       [7.7, 2.6, 6.9, 2.3],
       [6. , 2.2, 5. , 1.5],
       [6.9, 3.2, 5.7, 2.3],
       [5.6, 2.8, 4.9, 2. ],
       [7.7, 2.8, 6.7, 2. ],
       [6.3, 2.7, 4.9, 1.8],
       [6.7, 3.3, 5.7, 2.1],
       [7.2, 3.2, 6. , 1.8],
       [6.2, 2.8, 4.8, 1.8],
       [6.1, 3. , 4.9, 1.8],
       [6.4, 2.8, 5.6, 2.1],
       [7.2, 3. , 5.8, 1.6],
       [7.4, 2.8, 6.1, 1.9],
       [7.9, 3.8, 6.4, 2. ],
       [6.4, 2.8, 5.6, 2.2],
       [6.3, 2.8, 5.1, 1.5],
       [6.1, 2.6, 5.6, 1.4],
       [7.7, 3. , 6.1, 2.3],
       [6.3, 3.4, 5.6, 2.4],
       [6.4, 3.1, 5.5, 1.8],
       [6. , 3. , 4.8, 1.8],
       [6.9, 3.1, 5.4, 2.1],
       [6.7, 3.1, 5.6, 2.4],
```

```
y=df1.iloc[:,-1].values
y
```

```
array(['Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica'], dtype=object)
```

```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=30,random_state=42)
x_train
```

```
       [6.1, 3. , 4.6, 1.4],
       [4.5, 2.3, 1.3, 0.3],
       [6.6, 2.9, 4.6, 1.3],
       [5.5, 2.6, 4.4, 1.2],
       [5.3, 3.7, 1.5, 0.2],
       [5.6, 3. , 4.1, 1.3],
       [7.3, 2.9, 6.3, 1.8],
       [6.7, 3.3, 5.7, 2.1],
       [5.1, 3.7, 1.5, 0.4],
       [4.9, 2.4, 3.3, 1. ],
       [6.7, 3.3, 5.7, 2.5],
       [7.2, 3. , 5.8, 1.6],
       [4.9, 3.1, 1.5, 0.1],
       [6.7, 3.1, 5.6, 2.4],
       [4.9, 3. , 1.4, 0.2],
       [6.9, 3.1, 4.9, 1.5],
       [7.4, 2.8, 6.1, 1.9],
       [6.3, 2.9, 5.6, 1.8],
       [5.7, 2.8, 4.1, 1.3],
       [6.5, 3. , 5.5, 1.8],
       [6.3, 2.3, 4.4, 1.3],
       [6.4, 2.9, 4.3, 1.3],
       [5.6, 2.8, 4.9, 2. ],
       [5.9, 3. , 5.1, 1.8],
```

x_test

```
array([[6.1, 2.8, 4.7, 1.2],
       [5.7, 3.8, 1.7, 0.3],
       [7.7, 2.6, 6.9, 2.3],
       [6. , 2.9, 4.5, 1.5],
       [6.8, 2.8, 4.8, 1.4],
       [5.4, 3.4, 1.5, 0.4],
       [5.6, 2.9, 3.6, 1.3],
       [6.9, 3.1, 5.1, 2.3],
       [6.2, 2.2, 4.5, 1.5],
       [5.8, 2.7, 3.9, 1.2],
       [6.5, 3.2, 5.1, 2. ],
       [4.8, 3. , 1.4, 0.1],
       [5.5, 3.5, 1.3, 0.2],
       [4.9, 3.1, 1.5, 0.1],
       [5.1, 3.8, 1.5, 0.3],
       [6.3, 3.3, 4.7, 1.6],
       [6.5, 3. , 5.8, 2.2],
       [5.6, 2.5, 3.9, 1.1],
       [5.7, 2.8, 4.5, 1.3],
       [6.4, 2.8, 5.6, 2.2],
       [4.7, 3.2, 1.6, 0.2],
       [6.1, 3. , 4.9, 1.8],
       [5. , 3.4, 1.6, 0.4],
       [6.4, 2.8, 5.6, 2.1],
       [7.9, 3.8, 6.4, 2. ],
       [6.7, 3. , 5.2, 2.3],
       [6.7, 2.5, 5.8, 1.8],
       [6.8, 3.2, 5.9, 2.3],
       [4.8, 3. , 1.4, 0.3],
       [4.8, 3.1, 1.6, 0.2]])
```

y_train

```
array(['Iris-setosa', 'Iris-setosa', 'Iris-versicolor', 'Iris-setosa',
       'Iris-setosa', 'Iris-virginica', 'Iris-versicolor', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-virginica', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-setosa', 'Iris-setosa', 'Iris-versicolor',
       'Iris-virginica', 'Iris-virginica', 'Iris-versicolor',
       'Iris-virginica', 'Iris-versicolor', 'Iris-virginica',
       'Iris-versicolor', 'Iris-setosa', 'Iris-virginica',
       'Iris-versicolor', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-versicolor', 'Iris-virginica', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-versicolor', 'Iris-setosa', 'Iris-versicolor',
       'Iris-virginica', 'Iris-setosa', 'Iris-versicolor',
       'Iris-virginica', 'Iris-setosa', 'Iris-virginica',
       'Iris-virginica', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-virginica', 'Iris-versicolor', 'Iris-setosa',
       'Iris-versicolor', 'Iris-virginica', 'Iris-setosa', 'Iris-setosa',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa',
       'Iris-virginica', 'Iris-setosa', 'Iris-setosa', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-virginica', 'Iris-versicolor',
       'Iris-virginica', 'Iris-virginica', 'Iris-versicolor',
       'Iris-setosa', 'Iris-setosa', 'Iris-virginica', 'Iris-virginica',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-versicolor',
       'Iris-virginica', 'Iris-setosa', 'Iris-virginica',
       'Iris-virginica', 'Iris-setosa', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-virginica', 'Iris-versicolor',
       'Iris-virginica', 'Iris-setosa', 'Iris-virginica',
       'Iris-versicolor', 'Iris-virginica', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa',
       'Iris-versicolor', 'Iris-virginica', 'Iris-virginica',
```

```
            'Iris-setosa', 'Iris-versicolor', 'Iris-virginica',
            'Iris-virginica', 'Iris-setosa', 'Iris-virginica', 'Iris-setosa',
            'Iris-versicolor', 'Iris-virginica', 'Iris-virginica',
            'Iris-versicolor', 'Iris-virginica', 'Iris-versicolor',
            'Iris-versicolor', 'Iris-virginica', 'Iris-virginica',
            'Iris-setosa', 'Iris-versicolor', 'Iris-virginica', 'Iris-setosa',
            'Iris-versicolor', 'Iris-virginica'], dtype=object)
```

```
y_test
```

```
     array(['Iris-versicolor', 'Iris-setosa', 'Iris-virginica',
            'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa',
            'Iris-versicolor', 'Iris-virginica', 'Iris-versicolor',
            'Iris-versicolor', 'Iris-virginica', 'Iris-setosa', 'Iris-setosa',
            'Iris-setosa', 'Iris-setosa', 'Iris-versicolor', 'Iris-virginica',
            'Iris-versicolor', 'Iris-versicolor', 'Iris-virginica',
            'Iris-setosa', 'Iris-virginica', 'Iris-setosa', 'Iris-virginica',
            'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
            'Iris-virginica', 'Iris-setosa', 'Iris-setosa'], dtype=object)
```

```
from sklearn.preprocessing import StandardScaler
scaler=StandardScaler()
scaler.fit(x_train)
x_train=scaler.transform(x_train)
x_test=scaler.transform(x_test)
```

```
x_train
```

```
            [-0.01117388, -0.57925837,  0.78701097,  1.6226934 ],
            [-0.98634915,  0.77046987, -1.27728011, -1.30948358],
            [-0.98634915,  0.99542457, -1.21993869, -0.7763605 ],
            [ 0.11072303,  0.32056046,  0.61498672,  0.82300877],
            [-0.86445224, -1.25412249, -0.41715882, -0.10995664],
            [ 1.32969211,  0.32056046,  1.13105949,  1.48941263],
            [ 0.23261993, -0.80421307,  0.78701097,  0.55644722],
            [ 0.35451684, -1.02916778,  1.07371807,  0.28988568],
            [ 2.30486738, -0.12934896,  1.36042516,  1.48941263],
            [-0.37686461, -1.25412249,  0.15625537,  0.15660491],
            [-1.7177306 , -0.35430366, -1.33462153, -1.30948358],
            [-1.83962751, -0.12934896, -1.50664578, -1.44276436],
            [ 0.23261993, -1.9289866 ,  0.72966956,  0.42316645],
            [ 1.69538284,  0.32056046,  1.30308374,  0.82300877],
            [-1.47393679,  0.09560575, -1.27728011, -1.30948358],
            [-0.86445224,  0.99542457, -1.33462153, -1.17620281],
            [-1.7177306 , -0.12934896, -1.39196294, -1.30948358],
            [ 0.59831066, -1.25412249,  0.67232814,  0.42316645],
            [ 0.59831066,  0.77046987,  1.07371807,  1.6226934 ],
            [-1.47393679,  0.77046987, -1.33462153, -1.17620281],
            [ 1.2077952 , -0.12934896,  1.01637665,  1.22285108],
            [ 0.59831066,  0.54551516,  1.30308374,  1.75597417],
            [-1.35203988,  0.32056046, -1.39196294, -1.30948358],
            [ 0.35451684, -0.35430366,  0.5576453 ,  0.28988568],
            [ 0.84210448, -0.57925837,  0.50030388,  0.42316645],
            [ 0.47641375, -0.57925837,  0.61498672,  0.82300877],
            [ 1.45158902,  0.32056046,  0.5576453 ,  0.28988568],
            [ 0.72020757,  0.32056046,  0.90169381,  1.48941263],
            [-0.86445224,  1.67028869, -1.21993869, -1.30948358],
            [ 1.32969211,  0.09560575,  0.95903523,  1.22285108],
            [ 0.11072303, -0.12934896,  0.2709382 ,  0.42316645],
            [ 0.84210448, -0.12934896,  0.84435239,  1.08957031],
            [-0.13307079, -1.02916778, -0.13045173, -0.24323741],
            [-0.74255534, -0.80421307,  0.09891395,  0.28988568],
            [ 0.35451684, -0.12934896,  0.50030388,  0.28988568],
            [-1.5958337 , -1.7040319 , -1.39196294, -1.17620281],
            [ 0.96400139, -0.35430366,  0.50030388,  0.15660491],
            [-0.37686461, -1.02916778,  0.38562104,  0.02332414],
            [-0.62065843,  1.44533399, -1.27728011, -1.30948358],
            [-0.2549677 , -0.12934896,  0.21359679,  0.15660491],
            [ 1.81727975, -0.35430366,  1.475108  ,  0.82300877],
            [ 1.08589829,  0.54551516,  1.13105949,  1.22285108],
            [-0.86445224,  1.44533399, -1.27728011, -1.04292204],
            [-1.10824606, -1.47907719, -0.24513457, -0.24323741],
            [ 1.08589829,  0.54551516,  1.13105949,  1.75597417],
            [ 1.69538284, -0.12934896,  1.18840091,  0.55644722],
            [-1.10824606,  0.09560575, -1.27728011, -1.44276436],
            [ 1.08589829,  0.09560575,  1.07371807,  1.6226934 ],
            [-1.10824606, -0.12934896, -1.33462153, -1.30948358],
            [ 1.32969211,  0.09560575,  0.67232814,  0.42316645],
            [ 1.93917666, -0.57925837,  1.36042516,  0.95628954],
            [ 0.59831066, -0.35430366,  1.07371807,  0.82300877],
            [-0.13307079, -0.57925837,  0.21359679,  0.15660491],
            [ 0.84210448, -0.12934896,  1.01637665,  0.82300877],
            [ 0.59831066, -1.7040319 ,  0.38562104,  0.15660491],
            [ 0.72020757, -0.35430366,  0.32827962,  0.15660491],
            [-0.2549677 , -0.57925837,  0.67232814,  1.08957031],
            [ 0.11072303, -0.12934896,  0.78701097,  0.82300877],
```

```
x_test
```

```
array([[ 0.35451684, -0.57925837,  0.5576453 ,  0.02332414],
       [-0.13307079,  1.67028869, -1.16259727, -1.17620281],
       [ 2.30486738, -1.02916778,  1.81915651,  1.48941263],
       [ 0.23261993, -0.35430366,  0.44296246,  0.42316645],
       [ 1.2077952 , -0.57925837,  0.61498672,  0.28988568],
       [-0.49876152,  0.77046987, -1.27728011, -1.04292204],
       [-0.2549677 , -0.35430366, -0.07311031,  0.15660491],
       [ 1.32969211,  0.09560575,  0.78701097,  1.48941263],
       [ 0.47641375, -1.9289866 ,  0.44296246,  0.42316645],
       [-0.01117388, -0.80421307,  0.09891395,  0.02332414],
       [ 0.84210448,  0.32056046,  0.78701097,  1.08957031],
       [-1.23014297, -0.12934896, -1.33462153, -1.44276436],
       [-0.37686461,  0.99542457, -1.39196294, -1.30948358],
       [-1.10824606,  0.09560575, -1.27728011, -1.44276436],
       [-0.86445224,  1.67028869, -1.27728011, -1.17620281],
       [ 0.59831066,  0.54551516,  0.5576453 ,  0.55644722],
       [ 0.84210448, -0.12934896,  1.18840091,  1.35613185],
       [-0.2549677 , -1.25412249,  0.09891395, -0.10995664],
       [-0.13307079, -0.57925837,  0.44296246,  0.15660491],
       [ 0.72020757, -0.57925837,  1.07371807,  1.35613185],
       [-1.35203988,  0.32056046, -1.21993869, -1.30948358],
       [ 0.35451684, -0.12934896,  0.67232814,  0.82300877],
       [-0.98634915,  0.77046987, -1.21993869, -1.04292204],
       [ 0.72020757, -0.57925837,  1.07371807,  1.22285108],
       [ 2.5486612 ,  1.67028869,  1.53244942,  1.08957031],
       [ 1.08589829, -0.12934896,  0.84435239,  1.48941263],
       [ 1.08589829, -1.25412249,  1.18840091,  0.82300877],
       [ 1.2077952 ,  0.32056046,  1.24574233,  1.48941263],
       [-1.23014297, -0.12934896, -1.33462153, -1.17620281],
       [-1.23014297,  0.09560575, -1.21993869, -1.30948358]])
```

```
from sklearn.neighbors import KNeighborsClassifier
knn=KNeighborsClassifier(n_neighbors=7)
knn.fit(x_train,y_train)
y_pred=knn.predict(x_test)
y_pred
```

```
array(['Iris-versicolor', 'Iris-setosa', 'Iris-virginica',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa',
       'Iris-versicolor', 'Iris-virginica', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-virginica', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-versicolor', 'Iris-virginica',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-virginica',
       'Iris-setosa', 'Iris-virginica', 'Iris-setosa', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-setosa', 'Iris-setosa'], dtype=object)
```

```
y_test
```

```
array(['Iris-versicolor', 'Iris-setosa', 'Iris-virginica',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-setosa',
       'Iris-versicolor', 'Iris-virginica', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-virginica', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-versicolor', 'Iris-virginica',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-virginica',
       'Iris-setosa', 'Iris-virginica', 'Iris-setosa', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-setosa', 'Iris-setosa'], dtype=object)
```

```
from sklearn.metrics import confusion_matrix,accuracy_score
cm=confusion_matrix(y_test,y_pred)
print(cm)
```

```
[[10  0  0]
 [ 0  9  0]
 [ 0  0 11]]
```

```
score=accuracy_score(y_test,y_pred)
score
```

```
1.0
```

```
from sklearn.metrics import ConfusionMatrixDisplay
label=['Iris-setosa','Iris-versicolor','Iris-virginica']
cmd=ConfusionMatrixDisplay(cm,display_labels=label)
cmd.plot()
```

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x7ecb736eee90>
```